

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1-12. (Canceled)

13. (Currently Amended) An axially flexible robot line routing apparatus for use with a robot arm having an axial path for the line, the routing apparatus comprising:

a wrist having a first member concentrically attached to the robot arm along the axial path and rotatably moveable with respect to the arm such that the wrist revolves with respect to the arm about an arm axis of rotation defined by the arm, the arm axis of rotation extending along a portion of the axial path, the axial path extending along a longitudinal axis of the arm;

at least one robot line positioned along the axial path;

a bellows positioned along the axial path connected to the line and the robot arm allowing extension or compression of the line along the axial path; and

a guide plate positioned along the axial path having at least one hole for passage of the line through the guide plate, the guide plate having a peripheral surface engaged by the bellows through a retaining ring positioned around the peripheral surface.

14. (Canceled)

15. (Previously Presented) The apparatus of claim 13 further comprising a mounting plate positioned between the wrist and the robot arm and attached to the robot arm, the mounting plate having a through hole concentrically positioned along the axial path.

16-18. (Canceled)

19. (Previously Presented) The apparatus of claim 13 wherein the bellows sealingly connects to the robot arm and the line.

20. (Canceled)

21. (Previously Presented) The apparatus of claim 15 further comprising an attaching flange for attaching the bellows to the mounting plate.

22. (Previously Presented) The apparatus of claim 13 wherein the bellows is axially displaceable along the axial path to accommodate movement of the wrist with respect to the robot arm and axial displacement of the line.

23. (Canceled)

24. (Previously Presented) The apparatus of claim 13 wherein the bellows is made from at least one of natural rubber, styrene butadiene rubber, acrylic nitrile rubber, chlorobutadiene rubber, fluorine rubber or polychlorotetrafluoroethylene.

25. (Previously Presented) The apparatus of claim 22 wherein the bellows is displaceable along the axial path in a range of about 5mm to 3mm.

26. (Currently Amended) An axially flexible robot line routing apparatus for use in routing lines along an axial path from a robot arm through a wrist comprising:

a wrist attached to the arm and rotatable with respect to the arm such that the wrist revolves with respect to the arm about a longitudinal arm axis of rotation defined by the arm, the longitudinal arm axis of the arm rotation extending along a portion of the axial path;

a mounting plate connected to the robot arm positioned between the robot arm and the wrist, the mounting plate having a through hole along the axial path;

at least one robot line passing from the robot arm through the mounting plate hole and the wrist along the axial path;

an axially displaceable bellows positioned along the axial path around a portion of the at least one line, the bellows is connected to the line and the mounting plate, and

a flange positioned along the axial path in concentric overlapping relation with a portion of the bellows for sealing connection of the bellows to the mounting plate.

27. (Previously Presented) The apparatus of claim 26 wherein the bellows sealingly connects to the mounting plate and the line.

28-29. (Canceled)

30. (Previously Presented) The apparatus of claim 26 further comprising a guide plate positioned along the axial path having at least one hole for passage of the at least one line and sealing engagement of the guide plate to the at least one line.

31-32. (Canceled)

33. (Currently Amended) An axially flexible robot line routing apparatus for use with a robot arm having an axial path for the line, the routing apparatus comprising:

a wrist having a first member concentrically attached to the robot arm along the axial path and rotatably moveable with respect to the arm such that the wrist revolves with respect to the arm about an arm axis of rotation defined by the arm, the arm axis of rotation extending along a portion of the axial path, the axial path extending along a longitudinal axis of the arm;

at least one robot line positioned along the axial path;

a bellows positioned along the axial path connected to the line and the robot arm allowing extension or compression of the line along the axial path;

a mounting plate positioned between the wrist and the robot arm and attached to the robot arm, the mounting plate having a through hole concentrically positioned along the axial path; and

an attaching flange for attaching the bellows to the mounting plate.

34. (Previously Presented) The apparatus of claim 33 wherein the bellows sealingly connects to the robot arm and the line.

35. (Previously Presented) The apparatus of claim 33 wherein the bellows is axially displaceable along the axial path to accommodate movement of the wrist with respect to the robot arm and axial displacement of the line.

36. (Previously Presented) The apparatus of claim 33 wherein the bellows is made from at least one of natural rubber, styrene butadiene rubber, acrylic nitrile rubber, chlorobutadiene rubber, fluorine rubber or polychlorotetrafluoroethylene.

37. (Previously Presented) The apparatus of claim 35 wherein the bellows is displaceable along the axial path in a range of about 5mm to 3mm.

38. – 40. (Canceled)

41. (Previously presented) The apparatus of claim 26, wherein the through hole of the mounting plate allows axial displacement of the line through the mounting plate.